

08/983318

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING NATIONAL PHASE OF
PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495**

To: The Commissioner of Patents
and Trademarks
Washington, D.C. 20231

(Our Deposit Account No. 03-3975
(Our Order No. 60258 / 244515
C# / M#

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty. Dkt. PMS244515 / 2960609US/43133
M# / Client Ref.

From: Pillsbury Madison & Sutro LLP, IP Group

Date: January 15, 1998

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

- | | | |
|---|--|--|
| 1. International Application

<u>PCT/ FI97 / 00298</u>
<u>↑ country code</u> | 2. International Filing Date

<u>20 May 1997</u>
Day MONTH Year | 3. Earliest Priority Date Claimed

<u>20 May 1996</u>
Day MONTH Year
(use item 2 if no earlier priority) |
|---|--|--|
4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:
- (a) ☒ 20 months from above item 3 date (b) ☐ 30 months from above item 3 date,
- (c) Therefore, the due date (unextendable) is January 20, 1998.
5. Title of Invention TRANSMITTING SUBSCRIBER IDENTITY IN MOBILE COMMUNICATION SYSTEM
6. Inventor(s) HUOTARI, Seppo

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7. ☒ Please immediately start national examination procedures (35 U.S.C. 371(f)).
8. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:
- a. ☐ Request;
- b. ☐ Abstract;
- c. pgs. Spec. and Claims;
- d. sheet(s) Drawing which are ☐ informal ☐ formal of size ☐ A4 ☐ 13" ☐ 14"
9. ☒ A copy of the International Application has been transmitted by the International Bureau.
10. A translation of the International Application into English (35 U.S.C. 371(c)(2))
- a. ☒ is transmitted herewith including: (1) ☒ Request; (2) ☐ Abstract;
- (3) 7 pgs. Spec. and Claims;
- (4) 2 sheet(s) Drawing which are:
- ☐ informal ☒ formal of size ☒ A4 ☐ 11"
- b. ☐ is not required, as the application was filed in English.
- c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
- d. ☐ Translation verification attached (not required now).
11. ☒ **PLEASE AMEND** the specification before its first line by inserting as a separate paragraph:
- This application is the national phase of international application PCT/ FI97 / 00298
filed May 20, 1997 which designated the U.S.--

12. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file if in English but, if in foreign language, file only if not transmitted by the International Bureau) including:
13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau.
14. ☐ Translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of claim amendments made before 18th month, is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered cancelled).
15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))
 a. ☒ is submitted herewith ☐ Original ☒ Facsimile/Copy
 b. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
16. **An International Search Report (ISR):**
 a. Was prepared by ☐ European Patent Office ☐ Japanese Patent Office ☒ Other
 b. ☒ has been transmitted by the International Bureau to PTO.
 c. ☒ copy herewith (1 pg(s).) ☐ plus Annex of family members (1 pg(s).).
17. **International Preliminary Examination Report (IPER):**
 a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
 b. ☐ copy herewith in English
 c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
 c.2 ☐ Specification/claim pages # _____ ☐ Drawing Sheets # _____
 c.3 ☐ Which resulted in cancellation of pages # _____ claims # _____
 Dwg Sheets # _____
 d. ☐ Translation of Annex(es) to IPER (required by 30th month due date, or else annexed amendments will be considered cancelled).
18. **Information Disclosure Statement** including:
 a. ☒ Attached Form PTO-1449 listing documents
 b. ☒ Attached copies of documents listed on Form PTO-1449
 c. ☒ A concise explanation of relevance of ISR references is given in the ISR.
19. ☒ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.
20. ☐ Copy of Power to IA agent.
21. ☐ **Drawings:** _____ sheet(s) per set: ☐ 1 set informal; ☐ Formal of size ☐ A4 ☐ 11"
22. ☐ _____ (No.) **Verified Statement(s)** establishing "small entity" status under Rules 9 & 27
23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) FINLAND of:

<u>Application No.</u>	<u>Filing Date</u>	<u>Application No.</u>	<u>Filing Date</u>
(1) <u>962128</u>	<u>May 20, 1996</u>	(4) _____	_____
(2) _____	_____	(5) _____	_____
(3) _____	_____	(6) _____	_____

 a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
 b. ☐ Copy of Form PCT/IB/304 attached.
24. Attached:

APPLICATION UNDER UNITED STATES PATENT LAWS

Invention: TRANSMITTING SUBSCRIBER IDENTITY IN MOBILE COMMUNICATION SYSTEM

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This is a:

- ☐ Provisional Application
 - ☐ Regular Utility Application
 - ☐ Continuing Application
 - ☒ PCT National Phase Application
 - ☐ Design Application
 - ☐ Reissue Application
 - ☐ Plant Application
 - ☐ Substitute Specification
- Sub. Spec filed _____
in App. No. ____/____

SPECIFICATION

08/983318

1

TRANSMITTING SUBSCRIBER IDENTITY IN MOBILE COMMUNICATION SYSTEM

FIELD OF THE INVENTION

The invention relates to a method of transmitting the identity of a
5 calling subscriber (subscriber A) to a called subscriber (subscriber B) in a mobile communication system comprising a home location register for permanent storage of subscriber data on mobile stations registered in the network, and at least one visitor location register for temporary storage of subscriber data on mobile stations located in the geographical area monitored by the visitor location register, whereby signalling that is unrelated to the speech connection is transmitted between the switching centres and registers of the mobile communication system.

The invention further relates to a mobile communication system comprising a home location register for permanent storage of subscriber data
15 on mobile stations registered in the network, and at least one visitor location register for temporary storage of subscriber data on mobile stations located in the geographical area monitored by the visitor location register. Signalling that is unrelated to the speech connection is transmitted between the switching centres and registers of the mobile communication system.

20 BACKGROUND OF THE INVENTION

A service usually offered by present mobile communication systems is notification of the identity of the calling subscriber (subscriber A) to the called subscriber (subscriber B) during call set-up. This enables subscriber B to identify the caller before answering the call.

25 Figure 1 in the attached drawing illustrates mobile MS_a terminating call set-up in a GSM-type mobile communication system. The Figure only shows the relevant network elements as far as call set-up signalling is concerned. At point 1 a call initiated by subscriber A is routed from the network of subscriber A (e.g. a mobile communication system PLMN or a public telephone network PSTN) to the Gateway MSC (GMSC) of the PLMN home network of subscriber B. The GMSC transmits an inquiry (message 2) about routing information to the home location register HLR of subscriber B. The subscriber data on the mobile station MS is permanently stored in the home location register HLR and temporarily in the visitor location register VLR in
30 whose area the mobile station MS is located. During location update, informa-

tion on the visitor location register VLR in whose area subscriber B is located is updated to the home location register HLR of subscriber B. In the example of Figure 1, subscriber B is located in another mobile communication network PLMN. At point 3, the home location register HLR transmits to the visitor location register VLR of subscriber B a request for a roaming number to the PLMN network to be visited. The visitor location register VLR reserves a Mobile Station Roaming Number (MSRN) and transmits the number to the home location register HLR in a reply message 4. The home location register HLR forwards the roaming number in message 5 to the GMSC of the home PLMN which inquired about the routing information. On the basis of the roaming number, the GMSC can then route the call to the mobile services switching centre MSC of subscriber B in the PLMN network visited, if necessary via a transmitting transit network, as in Figure 1, in a set-up message 6. Information on the identity of subscriber A is transmitted to subscriber B in a Calling Line Identity (CLI) field of the set-up message 6. The above kind of transmission of the calling subscriber identity is not always successful, e.g. when subscriber B is located in the area of another PLMN, as in Figure 1. Although call set-up is possible between different networks, all networks do not support the network signalling used in the transmission of the calling subscriber identity. In these cases the called subscriber is notified, in accordance with point 1.4 (version 4.4.1) of the recommendation GSM 02.81, that the CLI is not available.

BRIEF DESCRIPTION OF THE INVENTION

It is an object of the present invention to enable transmission of the identity of a calling subscriber to subscriber B even if call set-up does not support transmission of calling subscriber identity, e.g. because subscriber B is located in the area of another network.

This new type of transmission of the identity of subscriber A is achieved with the method of the invention, which is characterized that the identity of subscriber A is transmitted to the mobile services switching centre of subscriber B via signalling that is unrelated to the speech connection.

The invention further relates to a mobile communication system described in the preamble, which, according to the invention, is characterized in that it is arranged to transmit the identity of subscriber A to the mobile services switching centre of subscriber B via signalling that is unrelated to the speech connection.

The invention is based on the idea that the subscriber identity is transmitted in signalling traffic between the switching centres and registers of the mobile communication system, preferably before a call is established.

The advantage of such a method for transmission of the identity of subscriber A is that the identity of subscriber A can be transmitted to subscriber B irrespective of the signalling protocols of the networks used for call set-up.

A further advantage of the invention is that the identity of subscriber A can be transmitted to subscriber B to the area of another network, e.g. abroad.

LIST OF DRAWINGS

In the following the invention will be described in greater detail with reference to the accompanying drawings, in which

Figure 1 illustrates call set-up in a GSM system, and
Figure 2 shows transmission of subscriber A identity CLI according to the method of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention can be applied to any mobile communication system. By way of example, the invention will be described below in connection with the pan-European digital mobile communication system GSM. As to a more detailed description of the GSM system, reference is made to GSM recommendations and the publication "The GSM System for Mobile Communications", M. Mouly & M. Pautet, Palaiseau, France, 1992, ISBN:2-9507190-0-7.

Figure 1 illustrates signalling associated with call set-up, previously described in connection with state-of-the-art call set-up. In the following the invention will be described in more detail by means of a preferred embodiment with reference to Figure 1. In this embodiment the transmission of subscriber A identity is associated with message 3 of Figure 1. Using MAP signalling of the GSM system, the home location register HLR transmits a roaming number request by a PROVIDE_ROAMING_NUMBER message to the visitor location register VLR. In the preferred embodiment of the invention, the identity of the calling subscriber, e.g. the phone number or the ISDN number, is added to the PROVIDE_ROAMING_NUMBER message, thus enabling identification of subscriber A. As to the other messages of Figure 1, call set-up in a mobile communication system utilizing the method of the invention conforms with the

above described state-of-the-art technique.

Figure 2 illustrates the transmission of the CLI under call set-up according to the preferred embodiment of the invention. The calling subscriber (subscriber A) states his/her identity when initiating a call. At point 1 this information is forwarded via the PLMN home network of subscriber B to the GMSC in a manner known per se. At point 2 the GMSC forwards the CLI to the home location register HLR of subscriber B, e.g. in connection with the inquiry about routing information. In accordance with the invention, at point 3 the PROVIDE_ROAMING_NUMBER message of the request for a roaming number forwards the CLI from the home location register HLR to the visitor location register VLR, which stores the CLI. In accordance with prior art, the visitor location register VLR answers the request for a roaming number by allocating a roaming number MSRN to the call and by transmitting it to the home location register HLR (point 4), which forwards the roaming number to the GMSC for routing of the call (point 5). Once the set-up message 6 arrives from the GMSC, possibly via a public telephone network or another transit network to the mobile services switching centre MSC of subscriber B in the PLMN network being visited, the MSC makes an inquiry about subscriber data to the visitor location register VLR and receives in the answer, among other things, the identity of subscriber A. The MSC forwards the identity of subscriber A to subscriber B in a manner known per se.

The invention has been described above by way of an example with reference to Figures 1 and 2, in a case when call set-up is carried out via the GMSC of the home network of subscriber B. When subscriber A is located in the same network as the home location register HLR of subscriber B, the call does not have to be routed via the GMSC of subscriber B. Neither is there any need for the GMSC of Figure 1 if the switching centre of subscriber A or the gateway MSC of the network of subscriber A has the capacity to communicate directly with the home location register of subscriber B. In this case the call initiated by subscriber A does not have to be transmitted to the GMSC, but instead the switching centre of subscriber A, e.g. a mobile services switching centre, or the gateway MSC of the network of subscriber A transmits the routing inquiry direct to the home location register HLR of subscriber B (message 2' in Figure 1). The home location register HLR transmits a roaming number request to the visitor location register VLR in accordance with the above described embodiment of the invention by forwarding the identity of subscriber A

in message 3. In a reply message 4 the home location register HLR gets a roaming number MSRN in accordance with the set-up signalling described above. The home location register HLR transmits to the switching centre of subscriber A or the network gateway MSC of subscriber A the roaming number MSRN reserved by the visitor location register VLR in message 5' of Figure 1. Having received this message, the switching centre or the network gateway MSC of subscriber A routes the call to the mobile services switching centre of subscriber B, possibly via a transit network.

Transmission of the identity of subscriber A according to the present invention is also applicable when both subscriber A and subscriber B are located in the home PLMN of subscriber B. A prerequisite for the use of the method of the invention is that the CLI has been transmitted to the home location register HLR of subscriber B.

The drawings and the description related thereto are only intended to illustrate the idea of the invention. The details of the mobile communication system and the method for transmitting the identity of subscriber A of the invention may vary within the scope of the claims. Even though the invention has been described above mainly in connection with MAP signalling, the method can be realized by utilising other kinds of signalling between the mobile services switching centres and registers of a mobile communication system.

CLAIMS

1. A method of transmitting the identity of a calling subscriber (subscriber A) to a called subscriber (subscriber B) in a mobile communication system comprising a home location register (HLR) for permanent storage of
5 subscriber data on mobile stations (MS) registered in the network, and at least one visitor location register (VLR) for temporary storage of subscriber data on mobile stations (MS) located in the geographical area monitored by the visitor location register, whereby signalling that is unrelated to the speech connection is transmitted between the switching centres (GMSC, MSC) and registers
10 (HLR, VLR) of the mobile communication system, **characterized** in that the identity of subscriber A is transmitted to the mobile services switching centre (MSC) of subscriber B via signalling that is unrelated to the speech connection.
2. A method as claimed in claim 1, **characterized** in that the
15 identity of subscriber A is transmitted before call set-up.
3. A method as claimed in claim 1 or 2, **characterized** in that the home location register (HLR) transmits to the visitor location register (VLR) the identity of subscriber A in connection with a request for routing information.
- 20 4. A method as claimed in claim 3, **characterized** in that the identity of subscriber A is transmitted in a MAP PROVIDE_ROAMING_NUMBER message.
5. A method as claimed in any one of the preceding claims, **characterized** in that subscriber B is located in a visited network.
- 25 6. A mobile communication system comprising a home location register (HLR) for permanent storage of subscriber data on mobile stations (MS) registered in the network, and at least one visitor location register (VLR) for temporary storage of subscriber data on mobile stations (MS) located in the geographical area monitored by the visitor location register (VLR), whereby
30 signalling that is unrelated to the speech connection is transmitted between the switching centres (GMSC, MSC) and registers (HLR, VLR) of the mobile communication system, **characterized** in that the mobile communication system is arranged to transmit the identity of subscriber A to the mobile services switching centre (MSC) of subscriber B via signalling that is unrelated
35 to the speech connection.

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7. A mobile communication system as claimed in claim 6, **characterized** in that the home location register (HLR) is arranged to transmit the identity of subscriber A to the visitor location register (VLR) in connection with a request for routing information.

5

8. A mobile communication system as claimed in claim 7, **characterized** in that the home location register (HLR) is arranged to transmit the identity of subscriber A in a MAP PROVIDE_ROAMING_NUMBER message.

9. A mobile communication system as claimed in claim 6, 7 or 8,
10 **characterized** in that subscriber B is located in a visited network.

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the INVENTION ENTITLED Transmitting subscriber
identity in mobile communication system

the specification of which (CHECK applicable BOX(ES))

-> [] is attached hereto.

-> [] was filed on _____ as U.S. Application No. 0 / _____

BOX(ES) -> [X] was filed as PCT International Application No. PCT/FI 197 / 00298 on 20 May 1997.

-> and (if applicable to U.S. or PCT application), was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application:

PRIOR FOREIGN APPLICATION(S)

Number	Country	Day/MONTH/Year Filed	Date first Laid-open or Published	Date Patented or Granted	Priority Claimed Yes No
962128	FI	20 May 1996			X

I hereby claim domestic priority benefit under 35 U.S.C. 120/365 of the indicated United States applications listed below and PCT international applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application:

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)

Application No. (series code/serial no.)	Day/MONTH/Year Filed	Status pending, abandoned, patented	Priority Claimed Yes No
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Cushman Darby & Cushman Intellectual Property Group of Pillsbury Madison & Siro LLP, 1100 New York Avenue, N.W., Ninth Floor, East Tower, Washington, D.C. 20005-3918, telephone number (202) 861-3000 (to whom all communications are to be directed), and the below-named persons (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete names/numbers below of persons no longer with their firm and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above Firm and/or a below attorney in writing to the contrary.

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1. INVENTOR'S SIGNATURE: _____

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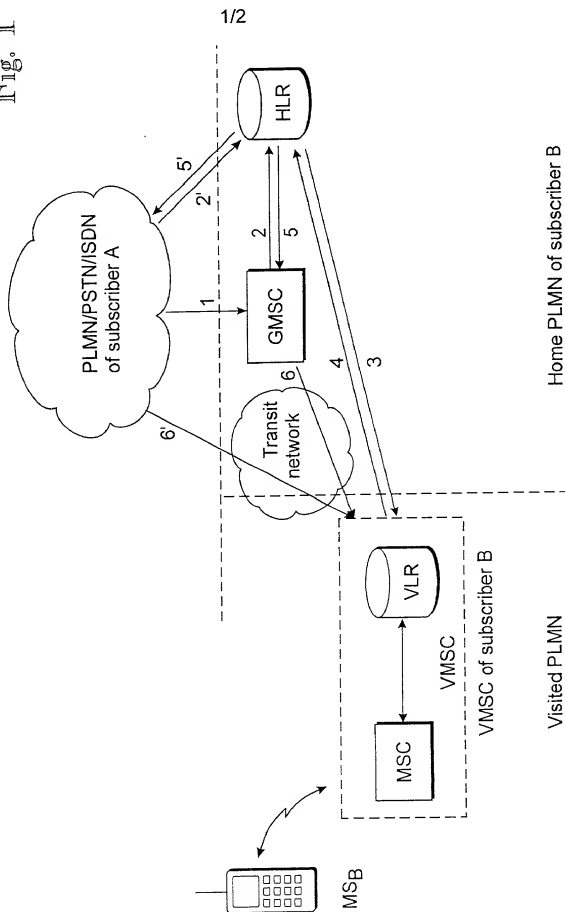
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3. INVENTOR'S SIGNATURE: _____

Inventor's Name (typed) _____ Date _____
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Residence (City) _____
Post Office Address (Include Zip Code) _____

(FOR ADDITIONAL INVENTORS, check box [] and attach sheet (CDC-116.2) for same information for each re signature, name, date, citizenship, residence and address.)

Fig. 1



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

08/983318

2/2

Fig. 2

